

Environmental Product Declaration (EPD)

According to ISO 14025 and EN

15804+A2:2019

Gypsum-anhydrite 0– 60 mm

Registration number:

EPD-Kiwa-EE-265338-EN

Issue date:

07-08-2026

Valid until:

07-08-2031

Declaration owner:

Gipsbergbau Engel GmbH

Publisher:

Kiwa-Ecobility Experts

Programme operator:

Kiwa-Ecobility Experts

Status:

verified

kiwa



1 General information

1.1 PRODUCT

Gypsum-anhydrite 0–60 mm

1.2 REGISTRATION NUMBER

EPD-Kiwa-EE-265338-EN

1.3 VALIDITY

Issue date: 07-08-2026

Valid until: 07-08-2031

1.4 PROGRAMME OPERATOR

Kiwa-Ecobility Experts
Wattstraße 11-13
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DE



Raoul Mancke

(Head of programme operations, Kiwa-Ecobility Experts)



Dr. Ronny Stadie

(Verification body, Kiwa-Ecobility Experts)

1.5 OWNER OF THE DECLARATION

Declaration owner: Gipsbergbau Engel GmbH

Address: Auf der Hill 6a, 54295 Trier, Germany

E-mail: werwie@engel-bergbau.de

Website:

Production location: Production

Address production location: Zur Gipsgrube 1, 54310 Ralingen, Germany

1.6 VERIFICATION OF THE DECLARATION

The independent verification is in accordance with the ISO 14025:2011. The LCA is in compliance with ISO 14040:2006 and ISO 14044:2006. The EN 15804+A2:2019 serves as the core PCR.

☐ Internal ☒ External



Boris Agarski , University of Novi Sad

1.7 STATEMENTS

The owner of this EPD shall be liable for the underlying information and evidence. The programme operator Kiwa-Ecobility Experts shall not be liable with respect to manufacturer data, life cycle assessment data and evidence.

1.8 PRODUCT CATEGORY RULES

Kiwa-EE GPI R.4.0, Kiwa-Ecobility Experts, General Programme Instructions "Product Level", SOP EE 1203_R.4.0 (18.12.2025)

Kiwa-EE GPI R.4.0 Annex B1, Kiwa-Ecobility Experts, General Programme Instructions "Product Level" – Annex B1 Environmental Information Programme according to EN 15804 / ISO 21930, SOP EE 1203_R.4.0 (18.12.2025)

Institute Construction and Environment e.V. (IBU) - Part B: Requirements on the EPD for Natural aggregates (v12, 2026)

1 General information

1.9 COMPARABILITY

In principle, a comparison or assessment of the environmental impacts of different products is only possible if they have been prepared in accordance with EN 15804+A2:2019. For the evaluation of the comparability, the following aspects have to be considered in particular: PCR used, functional or declared unit, geographical reference, the definition of the system boundary, declared modules, data selection (primary or secondary data, background database, data quality), scenarios used for use and disposal phases, and the life cycle inventory (data collection, calculation methods, allocations, validity period). PCRs and general program instructions of different EPD program operators may differ. Comparability needs to be evaluated. For further guidance, see EN 15804+A2:2019 and ISO 14025.

1.10 CALCULATION BASIS

LCA method R<THINK: Ecobility Experts | EN15804+A2

LCA software*: Simapro 9.6

Characterization method: RETHINK characterization method (see references for more details)

LCA database profiles: ecoinvent (for version see references)

Version database: v3.20f (20260507)

** Simapro is used for calculating the characterized results of the Environmental profiles within R<THINK.*

1.11 LCA BACKGROUND REPORT

This EPD is generated on the basis of the LCA background report 'Gypsum-anhydrite 0–60 mm' with the calculation identifier ReTHiNK-165338.

2 Product

2.1 PRODUCT DESCRIPTION

This is a specific EPD for 1 ton of Gypsum-anhydrite 0–60 mm, with a particle size of up to 60 mm, produced by Gipsbergbau Engel GmbH at Zur Gipsgrube 1, 54310 Ralingen, Germany.

Natural gypsum is a naturally formed gypsum/anhydrite rock. Natural gypsum contains no artificial additives or production residues. Natural gypsum from the Middle Muschelkalk of the Ralingen Formation is a natural mixture of various rocks, primarily gypsum and anhydrite. It was formed more than 232 million years ago through evaporation from a sea. Since then, it has been protected from weathering and foreign substances by natural overlying rock.

The average ratio within the excavated rock:

Material	m.-% of material
Gypsum	40%
Anhydrite	60%

2.2 APPLICATION (INTENDED USE OF THE PRODUCT)

Natural gypsum is used as a contaminant-free setting regulator in cement production, as a natural fertilizer (as a calcium and sulfate carrier), and in other applications.

2.3 REFERENCE SERVICE LIFE

RSL PRODUCT

The reference service life could not be determined in accordance with ISO 15686-1. According to the service lives of building components for life cycle analyses in accordance with the Assessment System for Sustainable Building BBSR Table 2017, the reference service life of precast concrete elements is over 50 years. Adding to this, the reference service live has not been taken into account in this EPD since the calculation method used to determine B1 is not taking the RSL into account.

USED RSL (YR) IN THIS LCA CALCULATION:

50

2.4 TECHNICAL DATA

Since this is a natural product, the composition may vary depending on the section of the mine. The bulk density of anhydrous anhydrite (CaSO₄) is approximately 2.98 g/cm³. The

bulk density of gypsum (calcium sulfate dihydrate, CaSO₄·2H₂O) is approximately 2.32 g/cm³. When exposed to water, anhydrite converts to gypsum. This results in a decrease in density and an increase in volume. The Mohs hardness of gypsum is 2, and that of anhydrite is between 3 and 3.5. The compressive strength of gypsum is 35 N/mm², and that of anhydrite is approx. 160 N/mm². The particle size of the product is up to 60 mm, as the size set on the crusher is 60 mm.

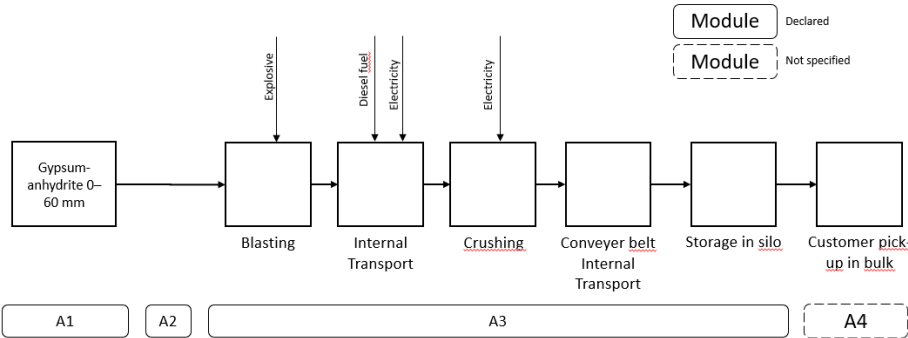
2.5 SUBSTANCES OF VERY HIGH CONCERN

The product does not contain any substances from the “Candidate List of Substances of Very High Concern” (SVHC) in amounts greater than 0.1% (1,000 ppm).

2.6 DESCRIPTION PRODUCTION PROCESS

The production process begins with geological planning and assessment. Gipsbergbau Engel GmbH works together with a geologist, to clarify the course of the rock formation within the mountain and to measure the material contents. Then, blast holes are drilled into the rock, and charged with explosives. This is where the inventory of the LCA starts. After blasting, the rock material is loaded by wheel loaders, onto dumpers. The dumpers transport the extracted material to the crusher. The crusher reduces the material size, and conveyor belts then transport the crushed material to the silos. The finished material is collected automatically by the company's customers.

Any residues in the production occur only in extremely small quantities and cannot be measured for the production of 1 ton of Gypsum-anhydrite. Therefore, such production-related waste is not taken into account.



3 Calculation rules

3.1 DECLARED UNIT

1 ton
1 ton of Gypsum-anhydrite 0–60 mm
Reference unit: ton (ton)

3.2 CONVERSION FACTORS

Description	Value	Unit
Reference unit	1	ton
Weight per reference unit	1000.000	kg
Conversion factor to 1 kg	0.001000	ton

3.3 SCOPE OF DECLARATION AND SYSTEM BOUNDARIES

This is a Cradle to gate EPD. The life cycle stages included are as shown below:
(X = module included, ND = module not declared)

A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

The modules of the EN 15804 contain the following:

Module A1 = Raw material supply	Module B5 = Refurbishment
Module A2 = Transport	Module B6 = Operational energy use
Module A3 = Manufacturing	Module B7 = Operational water use
Module A4 = Transport	Module C1 = De-construction / Demolition
Module A5 = Construction - Installation process	Module C2 = Transport
Module B1 = Use	Module C3 = Waste Processing
Module B2 = Maintenance	Module C4 = Disposal
Module B3 = Repair	Module D = Benefits and loads beyond the product system boundaries
Module B4 = Replacement	

3.4 REPRESENTATIVENESS

This EPD is representative for Gypsum-anhydrite 0–60 mm, a product of Gipsbergbau Engel GmbH. The results of this EPD are representative for Germany.

3.5 CUT-OFF CRITERIA

Product stage (A1-A3)
All input flows (e.g. raw materials, transportation, energy use, etc.) and output flows (e.g. production waste) are considered in this LCA. The total neglected input flows do therefore not exceed the limit of 5% of energy use and mass. Given that there is no raw material in the usual sense, all the operations were considered in A3. These included explosives and mining, internal transport, to crushing. All these informations were based on the primary data collected from the customer.



3 Calculation rules

Considering that the Gypsum-anhydrite 0–60 mm will be physically integrated with other products during installation so they cannot be physically separated at end of life, and the Gypsum-anhydrite 0–60 mm is no longer identifiable at end of life as a result of a physical or chemical transformation process, the modules B, C, and D are omitted.

Excluded processes are:

- Long-term emissions;
- The manufacture of equipment used in production, buildings or any other capital goods;
- The transport of personnel to the plant;
- The transportation of personnel within the plant;
- Research and development activities.

3.6 ALLOCATION

Allocations were avoided as far as possible. There are no co-products or by-products created in the manufacturing of the examined product. Based on energy consumption measurements, the energy requirements of the production were allocated to the individual products. Double counting was avoided. Specific information about allocations within the background data is included in the documentation of the ecoinvent datasets.

3.7 DATA COLLECTION & REFERENCE PERIOD

Primary data was collected and provided by Gipsbergbau Engel GmbH internally. The data has been collected for the year 2025, starting on the 1st of January and ending on the 31st of December. The electricity was determined using the average consumption on the level of the plant.

3.8 ESTIMATES AND ASSUMPTIONS

A payload factor of 50 percent was used for all truck transports, which in fact corresponds to a full delivery and empty return trip. A data set for a non-specific truck was used for the supplier transportation.

3.9 DATA QUALITY

The quality level of geographical representativeness can be considered “good”.

The quality level of technical representativeness can be considered “good”.

The quality level of time representativeness can also be regarded as “good”.

The overall data quality for this EPD can, therefore, be described as “good”. All relevant process-specific data were collected during data collection. In all possible cases, primary data from customers was used, which has very good data quality because it comes directly from the source. In addition, secondary data from the ecoinvent database (2022, version 3.9.1) was used when no primary data could be supplied. The database is checked regularly and, therefore, meets the requirements of DIN EN ISO 14040/44 (background data not older than 10 years). The background data meets the requirements of EN 15804+A2. The quantities of raw materials, consumables and supplies used and the energy consumption were recorded and averaged over the entire operating year. The general rule that specific data from certain production processes or average data derived from certain processes must take precedence when calculating an EPD or LCA was adhered to. Data for processes over which the manufacturer has no influence were assigned to generic data/scenarios. When selecting these, care was taken to always choose the data set/scenario that most realistically represents the processes.

3.10 POWER MIX

The market-based approach was used to calculate electricity consumption. The manufacturer sources 100% of its electricity from renewable energy sources (with a certificate of origin) from an electricity supplier. As the specific renewable energy sources covered by the Proofs of Origin were not specified, a dataset for hydropower (run-on-river) electricity profile was applied as a conservative assumption, representing the renewable electricity option with the highest environmental impacts among the available renewable generation profiles. The GWP-total of the used dataset Electricity, high voltage [DE]] electricity production, hydro, run-on-river | Cut-off, U is 0.00421 kg CO₂ eqv. per kWh. The datasets used from the database were on the conservative side, the GWP total of the modeled electricity shows higher impacts per kWh than what is declared by the electricity supplier. Same trend can be expected for other indicators as well.



4 Scenarios and additional technical information



5 Results

For the impact assessment long-term emissions (>100 years) are not considered. The results of the impact assessment are only relative statements that do not make any statements about end-points of the impact categories, exceedance of threshold values, safety margins or risks. The following tables show the results of the indicators of the impact assessment, of the use of resources as well as of waste and other output flows.

5.1 ENVIRONMENTAL IMPACT INDICATORS PER TON

CORE ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3
GWP-total	kg CO ₂ eq.	0.00E+0	0.00E+0	5.36E+0	5.36E+0
GWP-f	kg CO ₂ eq.	0.00E+0	0.00E+0	5.34E+0	5.34E+0
GWP-b	kg CO ₂ eq.	0.00E+0	0.00E+0	7.91E-3	7.91E-3
GWP-luluc	kg CO ₂ eq.	0.00E+0	0.00E+0	3.87E-3	3.87E-3
ODP	kg CFC 11 eq.	0.00E+0	0.00E+0	-1.69E-3	-1.69E-3
AP	mol H ⁺ eq.	0.00E+0	0.00E+0	2.47E-2	2.47E-2
EP-fw	kg P eq.	0.00E+0	0.00E+0	1.42E-4	1.42E-4
EP-m	kg N eq.	0.00E+0	0.00E+0	6.52E-3	6.52E-3
EP-T	mol N eq.	0.00E+0	0.00E+0	8.16E-2	8.16E-2
POCP	kg NMVOC eq.	0.00E+0	0.00E+0	2.01E-2	2.01E-2
ADP-mm	kg Sb-eq.	0.00E+0	0.00E+0	1.97E-2	1.97E-2
ADP-f	MJ	0.00E+0	0.00E+0	6.13E+1	6.13E+1
WDP	m ³ world eq.	0.00E+0	0.00E+0	1.10E+0	1.10E+0

GWP-total=Global Warming Potential total (GWP-total) | **GWP-f**=Global Warming Potential fossil fuels (GWP-fossil) | **GWP-b**=Global Warming Potential biogenic (GWP-biogenic) | **GWP-luluc**=Global Warming Potential land use and land use change (GWP-luluc) | **ODP**=Depletion potential of the stratospheric ozone layer (ODP) | **AP**=Acidification potential, Accumulated Exceedance (AP) | **EP-fw**=Eutrophication potential, fraction of nutrients reaching freshwater end compartment (EP-freshwater) | **EP-m**=Eutrophication potential, fraction of nutrients reaching marine end compartment (EP-marine) | **EP-T**=Eutrophication potential, Accumulated Exceedance (EP-terrestrial) | **POCP**=Formation potential of tropospheric ozone (POCP) | **ADP-mm**=Abiotic depletion potential for non fossil resources (ADP mm) | **ADP-f**=Abiotic depletion for fossil resources potential (ADP fossil) | **WDP**=Water (user) deprivation potential, deprivation-weighted water consumption (WDP)

5 Results

ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS EN 15804+A2

Abbr.	Unit	A1	A2	A3	A1-A3
PM	disease incidence	0.00E+0	0.00E+0	2.10E-3	2.10E-3
IR	kBq U235 eq.	0.00E+0	0.00E+0	4.70E-2	4.70E-2
ETP-fw	CTUe	0.00E+0	0.00E+0	3.33E+1	3.33E+1
HTP-c	CTUh	0.00E+0	0.00E+0	3.14E-5	3.14E-5
HTP-nc	CTUh	0.00E+0	0.00E+0	9.53E-8	9.53E-8
SQP	Pt	0.00E+0	0.00E+0	1.12E+1	1.12E+1

PM=Potential incidence of disease due to PM emissions (PM) | **IR**=Potential Human exposure efficiency relative to U235 (IRP) | **ETP-fw**=Potential Comparative Toxic Unit for ecosystems (ETP-fw) | **HTP-c**=Potential Comparative Toxic Unit for humans (HTP-c) | **HTP-nc**=Potential Comparative Toxic Unit for humans (HTP-nc) | **SQP**=Potential soil quality index (SQP)

CLASSIFICATION OF DISCLAIMERS TO THE DECLARATION OF CORE AND ADDITIONAL ENVIRONMENTAL IMPACT INDICATORS

ILCD classification	Indicator	Disclaimer
ILCD type / level 1	Global warming potential (GWP)	None
	Depletion potential of the stratospheric ozone layer (ODP)	None
	Potential incidence of disease due to PM emissions (PM)	None
ILCD type / level 2	Acidification potential, Accumulated Exceedance (AP)	None
	Eutrophication potential, Fraction of nutrients reaching freshwater end compartment (EP-freshwater)	None
	Eutrophication potential, Fraction of nutrients reaching marine end compartment (EP-marine)	None
	Eutrophication potential, Accumulated Exceedance (EP-terrestrial)	None
	Formation potential of tropospheric ozone (POCP)	None
	Potential Human exposure efficiency relative to U235 (IRP)	1
	Abiotic depletion potential for non-fossil resources (ADP-minerals&metals)	2
ILCD type / level 3	Abiotic depletion potential for fossil resources (ADP-fossil)	2
	Water (user) deprivation potential, deprivation-weighted water consumption (WDP)	2
	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	2
	Potential Comparative Toxic Unit for humans (HTP-c)	2
	Potential Comparative Toxic Unit for humans (HTP-nc)	2



5 Results

ILCD classification	Indicator	Disclaimer
	Potential Soil quality index (SQP)	2
Disclaimer 1 – This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.		
Disclaimer 2 – The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experienced with the indicator.		

5.2 INDICATORS DESCRIBING RESOURCE USE AND ENVIRONMENTAL INFORMATION BASED ON LIFE CYCLE INVENTORY (LCI)

PARAMETERS DESCRIBING RESOURCE USE

Abbr.	Unit	A1	A2	A3	A1-A3
PERE	MJ	0.00E+0	0.00E+0	5.50E+0	5.50E+0
PERM	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0
PERT	MJ	0.00E+0	0.00E+0	5.50E+0	5.50E+0
PENRE	MJ	0.00E+0	0.00E+0	6.12E+1	6.12E+1
PENRM	MJ	0.00E+0	0.00E+0	1.21E-1	1.21E-1
PENRT	MJ	0.00E+0	0.00E+0	6.13E+1	6.13E+1
SM	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0
RSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0
NRSF	MJ	0.00E+0	0.00E+0	0.00E+0	0.00E+0
FW	m ³	0.00E+0	0.00E+0	3.35E-2	3.35E-2

PERE=Use of renewable primary energy excluding renewable primary energy resources used as raw materials | **PERM**=Use of renewable primary energy resources used as raw materials | **PERT**=Total use of renewable primary energy resources | **PENRE**=Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials | **PENRM**=Use of non-renewable primary energy resources used as raw materials | **PENRT**=Total use of non-renewable primary energy resources | **SM**=Use of secondary material | **RSF**=Use of renewable secondary fuels | **NRSF**=Use of non-renewable secondary fuels | **FW**=Net use of fresh water



5 Results

OTHER ENVIRONMENTAL INFORMATION DESCRIBING WASTE CATEGORIES

Abbr.	Unit	A1	A2	A3	A1-A3
HWD	Kg	0.00E+0	0.00E+0	3.35E-3	3.35E-3
NHWD	Kg	0.00E+0	0.00E+0	6.95E-1	6.95E-1
RWD	Kg	0.00E+0	0.00E+0	3.08E-5	3.08E-5

HWD=Hazardous waste disposed | **NHWD**=Non-hazardous waste disposed | **RWD**=Radioactive waste disposed

ENVIRONMENTAL INFORMATION DESCRIBING OUTPUT FLOWS

Abbr.	Unit	A1	A2	A3	A1-A3
CRU	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0
MFR	Kg	0.00E+0	0.00E+0	5.31E-1	5.31E-1
MER	Kg	0.00E+0	0.00E+0	0.00E+0	0.00E+0
EET	MJ	0.00E+0	0.00E+0	3.74E-2	3.74E-2
EEE	MJ	0.00E+0	0.00E+0	2.17E-2	2.17E-2

CRU=Components for re-use | **MFR**=Materials for recycling | **MER**=Materials for energy recovery | **EET**=Exported Energy, Thermic | **EEE**=Exported Energy, Electric

5 Results

5.3 INFORMATION ON BIOGENIC CARBON CONTENT PER TON

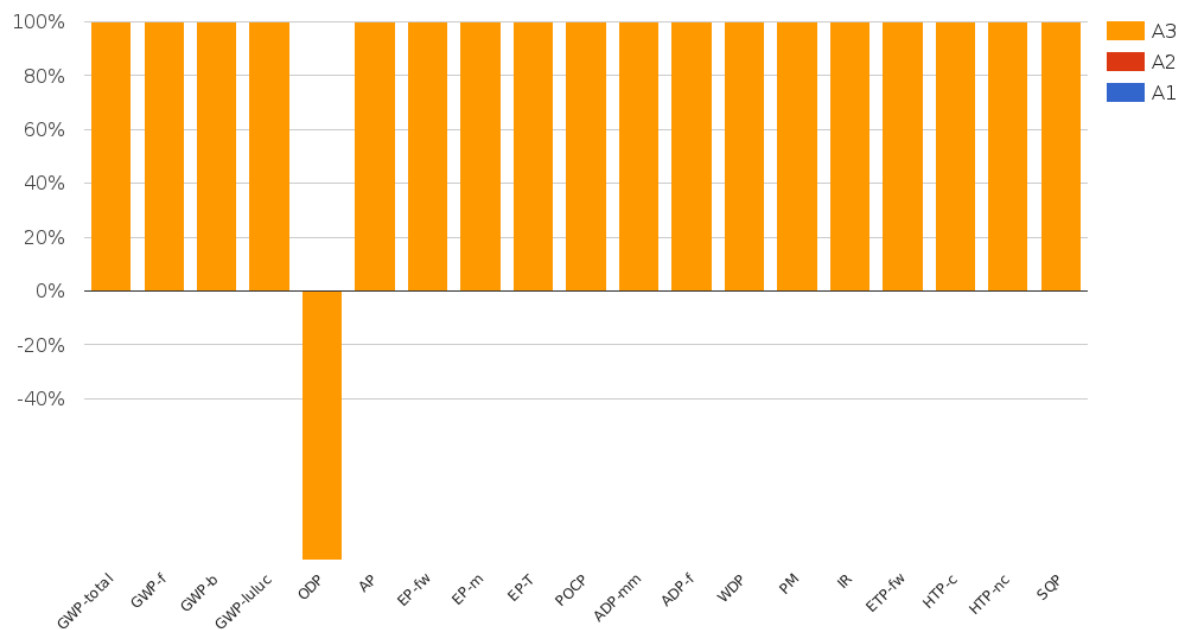
BIOGENIC CARBON CONTENT

The following Information describes the biogenic carbon content in (the main parts of) the product at the factory gate per ton:

Biogenic carbon content	Amount	Unit
Biogenic carbon content in the product	0	kg C
Biogenic carbon content in accompanying packaging	0	kg C



6 Interpretation of results



Given that the Gypsum-anhydrite 0–60 mm is carried out by mining in a mine, which means that the production of the raw material comes burden-free, the environmental impacts come from A3. Since the crushing takes place within the company site and in the near proximity to the mine, there is no transport to account for within A2, and internal transport (which is responsible for a significant portion of the impacts) as well as the transport of the materials used in A3 (explosives, lubricants...) is included in A3. When it comes to the carbon footprint, internal transport is the biggest contributor, followed by explosives. Electricity comes with significantly lower carbon footprint, while other carbon contributions can be considered negligible.

7 References

Ecoinvent

ecoinvent Version 3.9.1 (December 2022), cut-off by classification

EN 15804+A2

EN 15804:2012+A2:2019/AC:2021, Sustainability of Buildings - Environmental Product Declarations - Framework Development Rules by Product Category

Institute Construction and Environment e.V. (IBU) - Part B

Requirements on the EPD for Natural aggregates (v12, 2026)

ISO 14025

ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures

ISO 14040

ISO 14040:2006-10, Environmental management - Life cycle assessment - Principles and framework; EN ISO 14040:2006

ISO 14044

ISO 14044:2006-10, Environmental management - Life cycle assessment - Requirements and guidelines; EN ISO 14044:2006

ISO 15686

ISO 15686-1:2011. Buildings and constructed assets — Service life planning — Part 1: General principles and framework. 2nd edition

Kiwa-EE GPI R.4.0

Kiwa-Ecobility Experts, General Programme Instructions “Product Level”, SOP EE 1203_R. 2.0 (27.02.2025)

Kiwa-EE GPI R.4.0 Annex B1

Kiwa-Ecobility Experts, General Programme Instructions “Product Level” – Annex B1 Environmental Information Programme according to EN 15804 / ISO 21930, SOP EE 1203_R. 2.0 (27.02.2025)

R<THINK characterization method

ecoinvent 3.9.1: EN 15804+A1 indicators (CML-IA Baseline v3.09), EN 15804+A2 indicators (EF 3.1)

Stichting Nationale Milieudatabase

Update processing scenarios – May 2024. Nationale Milieudatabase

8 Contact information

Publisher	Operator	Owner of declaration
		
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Kiwa-Ecobility Experts is established member of the 

